

CONNECTME

Maine's Broadband Authority

Peggy Schaffer, Director

July 23, 2019

Universal Broadband can save the planet



SERIOUSLY?

Yes.

- ▶ Transportation
- ▶ Health Care
- ▶ Educational Attainment
- ▶ Farming, Fishing
- ▶ Energy
- ▶ Community Sustainability
- ▶ Jobs

Transportation alone produces nearly *thirty percent* of all US global warming emissions, more than almost any other sector. (UCSUSA)

- ▶ More people can work from home.
- ▶ More people can conduct daily activities from home (banking, shopping, routine medical care).
- ▶ Traffic management can be smarter and more responsive.
- ▶ Trucking can be more efficient in delivery/Just in Time.
- ▶ Cars can run on green energy.

Health Care

- ▶ You can visit your doctor without leaving home.
- ▶ You can have access to world class treatment, no matter where you are.
- ▶ Increase the efficiency/effectiveness of medical care.
- ▶ Decrease emergency room utilization.
- ▶ Increase access to mental health/opioid treatment.

Education Attainment

- ▶ K-12 students have access to the best educational resources possible, right in their own community.
- ▶ Every student, no matter what their income level, has access to all the resources available on the web.
- ▶ Teachers can expand their curricula, providing individualized learning for each student.
- ▶ No matter where you live in Maine, you can get a post secondary degree, or credential without traveling, or on your own schedule.

Farming and Fishing

- ▶ Farmers can know what part of their crops need water, fertilizer, is ready to harvest, based on real time information.
- ▶ Farmers can produce more food, more sustainably on the same crop land for a lower cost.
- ▶ Fishermen and farmers have a better knowledge of weather conditions.
- ▶ Fishermen can minimize by-catch, and know what fish the market is buying.
- ▶ Be better connected with markets, production, reducing waste.

Energy

- ▶ Consumers (including businesses) know when they are using electricity and could reduce peak demand on the grid.
- ▶ Know when green energy is most abundant and switch their uses to take advantage of that availability.
- ▶ A 2007 study found wide adoption and use of broadband applications can achieve a net reduction of 1 billion tons of greenhouse gas over 10 years, which, if converted into energy saved, would constitute 11% of annual U.S. oil imports.
- ▶ Reduce the size of big box infrastructure (industry and commercial).
- ▶ Monitor your own energy waste/use at your home/business.

Community Sustainability

- ▶ More efficient and effective Government services - from better monitoring of water and sewer to street lights and beyond.
- ▶ People can choose to work from where they live vs. live from where they work.
- ▶ Our aging population can stay in the communities they have lived in (and contributed to) much longer.
- ▶ Younger families can have the same opportunities for education, jobs, social interaction in more rural areas that they can in urban areas.

JOB GROWTH

- ▶ Live where you want, work anywhere (Bonus - reduces the cost for industry, including energy).
- ▶ Vibrant communities support and grow jobs within those communities.
- ▶ Businesses operate more efficiently.
- ▶ Better access to markets, no matter where you are.
- ▶ New ideas, new business models, new technologies flourish on the internet (AirBnB, Uber).
- ▶ Brings new opportunities to areas that could not sustain those before.

So. YES! BROADBAND CAN SAVE THE PLANET

BUT:

- ▶ Equity is mandatory
- ▶ Digital literacy is critical
- ▶ **EVERYONE** must be connected with a fast, reliable, secure network
- ▶ A cellular connection is not good enough. Yet.

Everybody gets a gig!
(or access to one.)

MAINE must become a
Symmetrical Gig State.

How do we get
there?

First, Some basics: X/Y?

- ▶ **Download speed (X):** How quickly your Internet connection can retrieve data from the Internet (web pages, video, cat photos, etc.)
- ▶ **Upload speed (Y):** How quickly your Internet connection can send data from your devices up to the Internet (uploading video to YouTube, sending documents via email, etc.)

▶ **Download is how the world talks to Maine.**

▶ **Upload is how Maine talks to the world.**

Technology: DSL

- ▶ **Digital Subscriber Line (DSL)**
- ▶ Used primarily by traditional telephone system operators to deliver Internet services over twisted pair copper telephone wires.
- ▶ Speed depends on closeness to the digital subscriber line access multiplexer (DSLAM). Generally seen as 10/1, but can be higher.

Also in use:

- ▶ **Very High data rate Digital Subscriber Line (VDSL)**. An extremely fast connection, VDSL is asymmetric, but only works over a short distance using standard copper phone wiring. Can be as high as 52/16, but distance to the DSLAM is the deciding factor on speed.

Hybrid Fiber / Coax - network architecture utilized by the cable system operators here in Maine.

- ▶ Fiber-optic trunk lines (can provide adequate bandwidth for future expansion)
- ▶ Community Level: An optical node translates the signal from a light beam to an electrical signal, and sends it over coaxial cable lines for distribution to subscriber residences.
- ▶ Data over Cable Service Interface Specification (DOCSIS)
 - ▶ DOCSIS 3.1, is capable of supporting Internet speeds of up to 10 Gbps, but most providers can offer speeds of 1 Gbps or less for residential users.

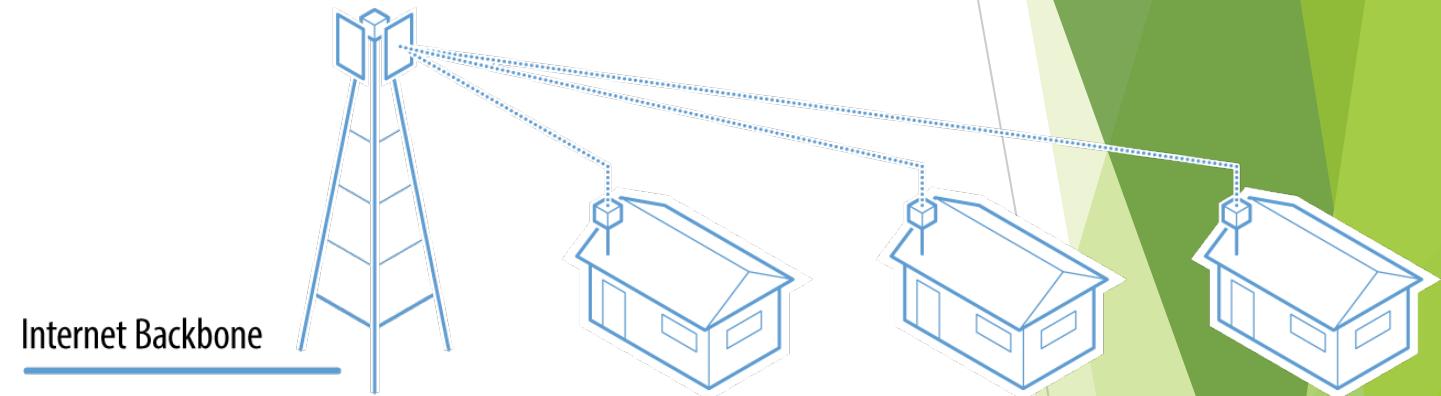
Fiber -

Capable of delivering the speed of light.

- ▶ A network utilizing fiber optic cables (glass) directly to the home or business and is capable of offering virtually unlimited symmetrical bandwidth.
- ▶ Most fiber networks offer 1 Gbps of bandwidth symmetrical, with some providers offering 2 Gbps and even 10 Gbps service capacity (or more)

Fixed Wireless

- ▶ Wireless broadband wireless devices or systems used to connect two fixed locations with a radio or other wireless link.
- ▶ Often a cost effective alternative to laying or leasing fiber
- ▶ Line-of-sight is usually necessary
- ▶ Speed limits are based on spectrum used, but can be similar to DSL or Cable.



Satellite

PROS:

- ▶ Not based on a network connection.
- ▶ Can reach places where there is nothing.

CONS:

- ▶ Latency issues
- ▶ Low speeds
- ▶ Data Caps

Future?

Many companies launching LOTS more satellites, but many, many, many more are required.

WHAT ABOUT 5G?

(much of Maine still has not gotten 4g)

PROS:

- Wicked Fast, greater reliability
- Will allow for fast connectivity whether you are on wifi or cell
- In more urban markets can serve a large number of customers who are close enough to the node.

CONS:

- Requires loads of Deep Fiber
- Each 5G transmitter can only transmit about 200M
- New phone.
- Cannot go through walls, trees, mountains.
- Requires LOTS and LOTS of Fiber
- Lots more stuff on the poles.

Key Terms:

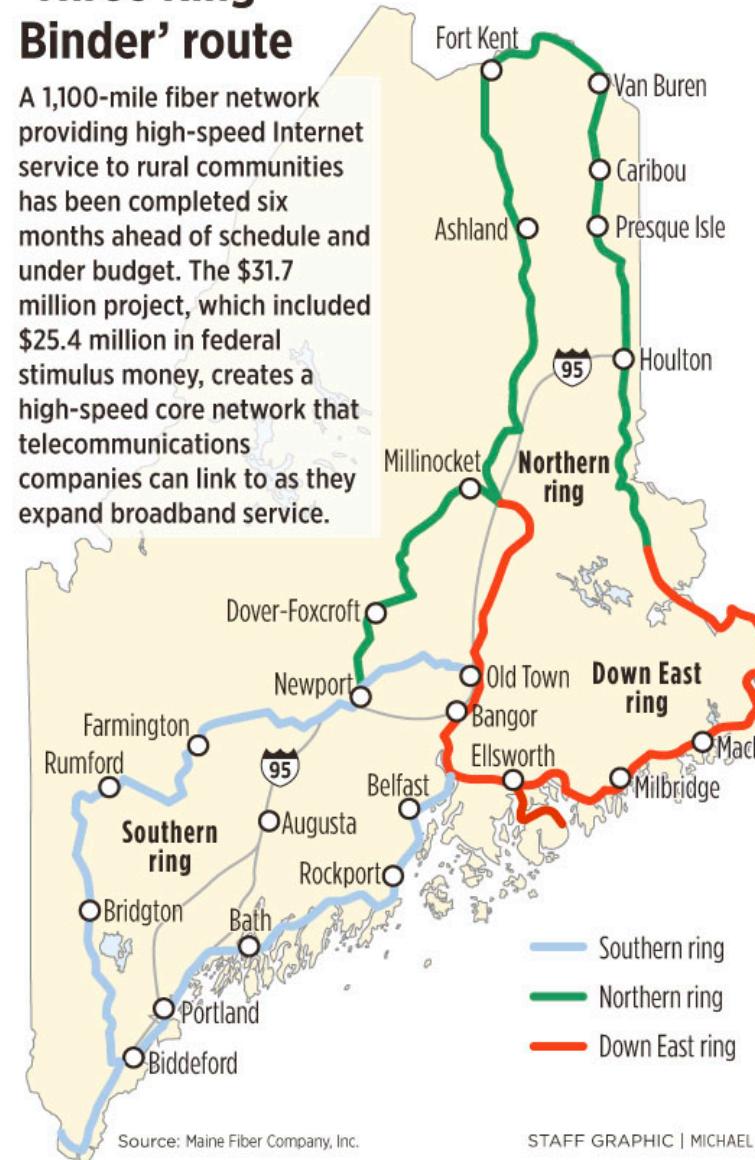
- ▶ Open Access
- ▶ Over Build
- ▶ Middle Mile/Last Mile
- ▶ Dark Fiber
- ▶ Lit Fiber
- ▶ FTTP/FTTH/FTTN
- ▶ Public/Private “Partnerships”
- ▶ FCC 477 Data
- ▶ FCC definition of Served (25/3)

Maine Assets

- ▶ 3 Ring Binder
- ▶ Great local providers/
Vendors
- ▶ ConnectME ☺
- ▶ Maine School Library
Network
- ▶ Maine Broadband
Coalition ☺
- ▶ Community planning
- ▶ Momentum

‘Three Ring Binder’ route

A 1,100-mile fiber network providing high-speed Internet service to rural communities has been completed six months ahead of schedule and under budget. The \$31.7 million project, which included \$25.4 million in federal stimulus money, creates a high-speed core network that telecommunications companies can link to as they expand broadband service.



Source: Maine Fiber Company, Inc.

STAFF GRAPHIC | MICHAEL FISHER

MAINE HOUSEHOLD DATA 25/3 MBPS			
County	Total households	Households with less than 25/3 Mbps	% of households with less than 25/3 Mbps
Maine	722,106	83,144	11.5
Piscataquis	7,572	5,826	76.94
Franklin	11,684	6,196	53.03
Hancock	23,748	8,290	34.91
Waldo	16,820	5,395	32.07
Washington	14,065	4,399	31.28
Oxford	20,723	5,498	26.53
Somerset	21,376	4,917	23.00
Aroostook	29,852	5,080	17.02
Lincoln	15,021	1,385	9.22
Penobscot	61,787	5,461	8.84
Sagadahoc	15,613	1,366	8.75
Knox	16,813	1,276	7.59
Kennebec	50,829	1,047	2.06
York	82,588	972	1.18
Cumberland	117,871	1,068	0.91
Androscoggin	44,747	318	0.71

- Dramatic gap between rural and urban counties
- Developed using FCC Form 477 data which assumes that if one address in a census block is covered the entire block is covered so the availability is overstated.
- Information is accurate from a directional perspective and is aligned to what the FCC will use to make their decisions.

United States of Broadband

Data ?

FCC Advertised Download Speed

► Sources & Data Notes:

Area ?

County

Time Period ?

Dec 2017

Zoom to State ?

Maine

Data Range

0.2 4 10 25 50 100

Sherbrooke

Montpelier

VERMONT

NEW HAMPSHIRE

Concord

Portland

Augusta

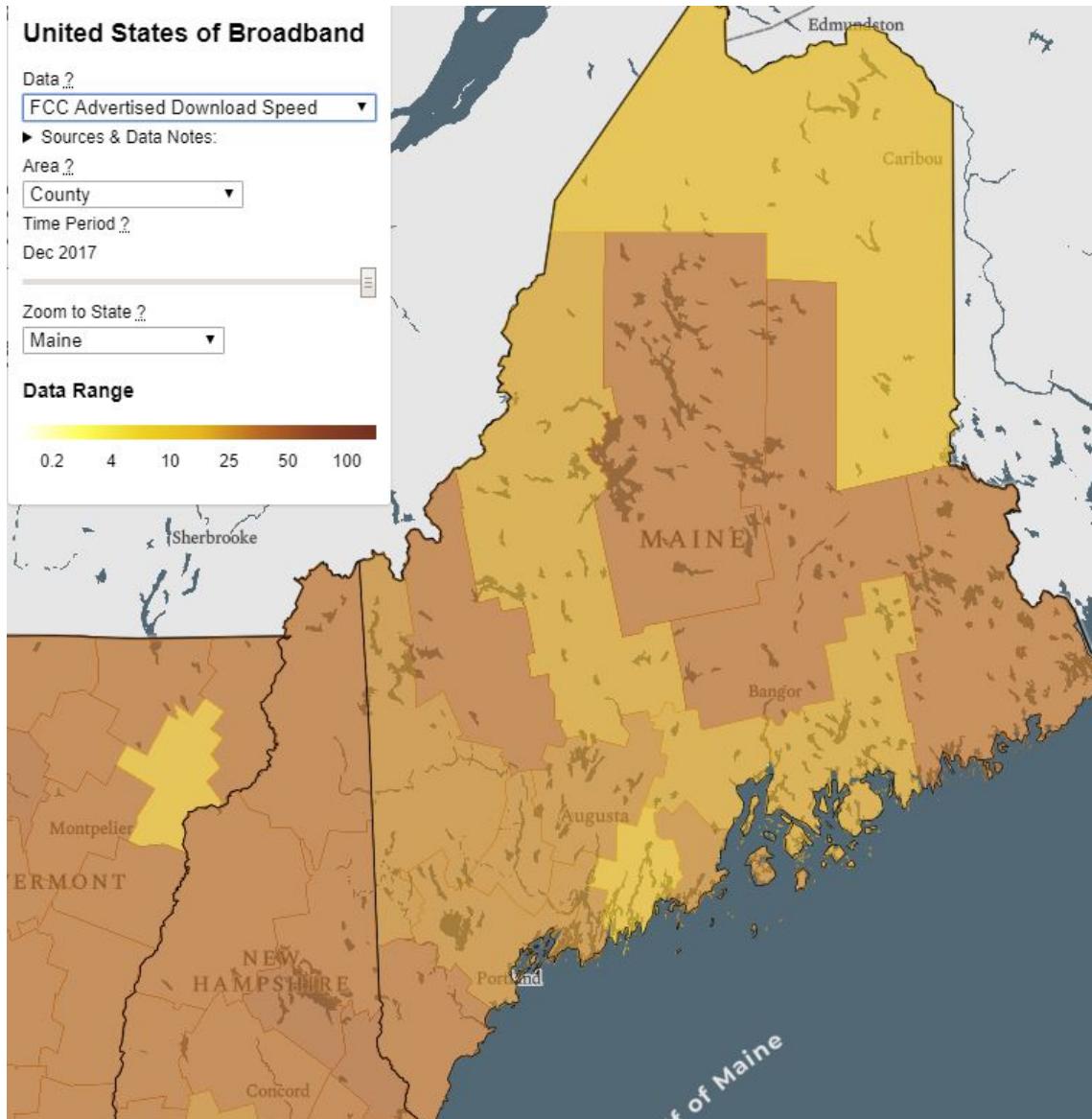
Bangor

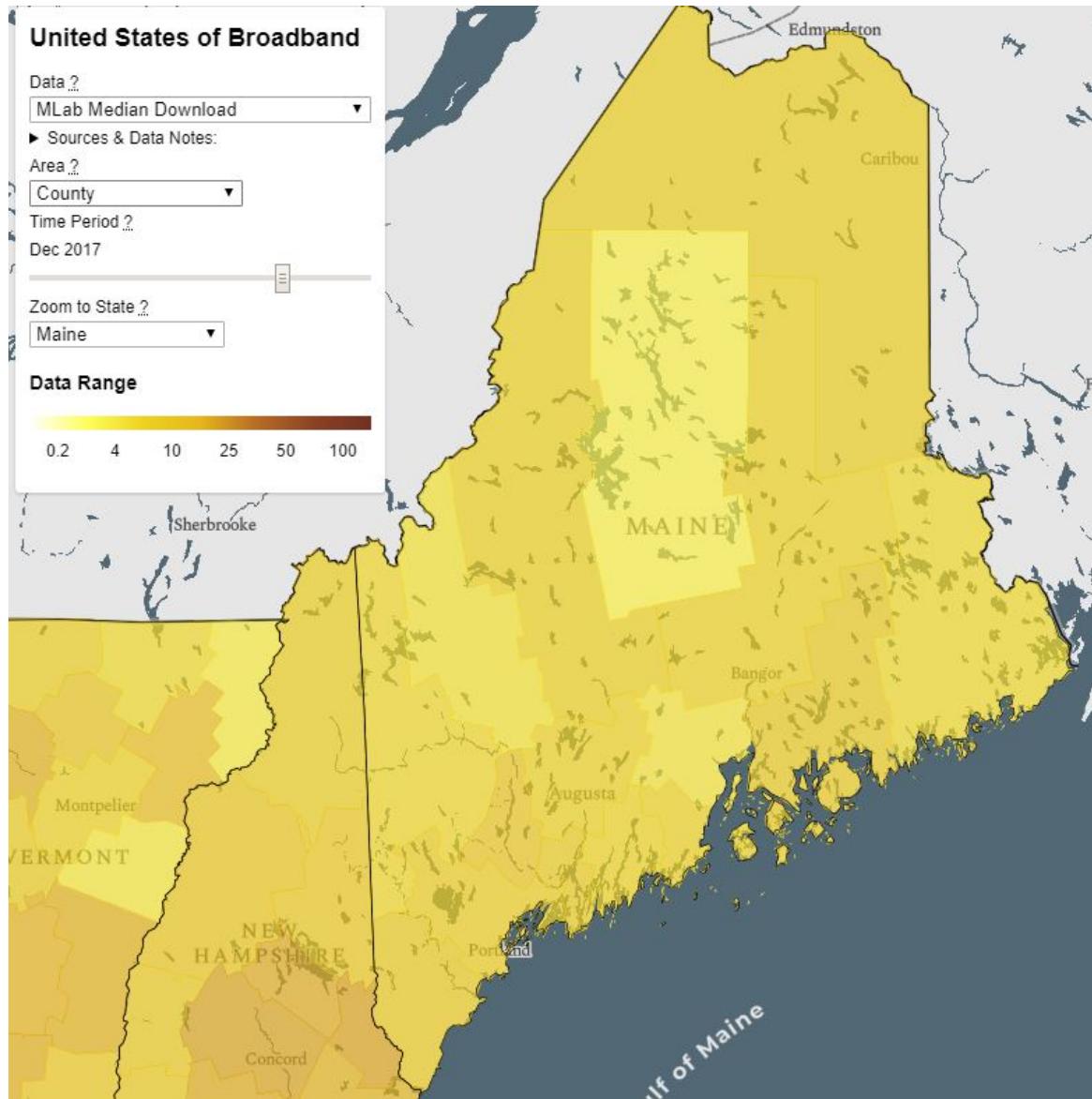
MAINE

Edmundston

Caribou

Edmundston





We are using more. LOTS MORE. That is only going to increase.

World Wide Users:

12/1995 - 16 M

3/2019 - 4,346M (up 33M since 12/ 2018)

Average monthly data use for households grew from:

- **201.6 gigabytes in 2017 to 268.7 gigabytes in 2018**
- **Growth rate of 33%.**
- **An increase of 67.1 gigabytes a year, no signs of slowing**

% of U.S. adults who are home broadband users, by age

100

75

50

25

0

2002 2004 2006 2008 2010 2012 2014 2016 2018

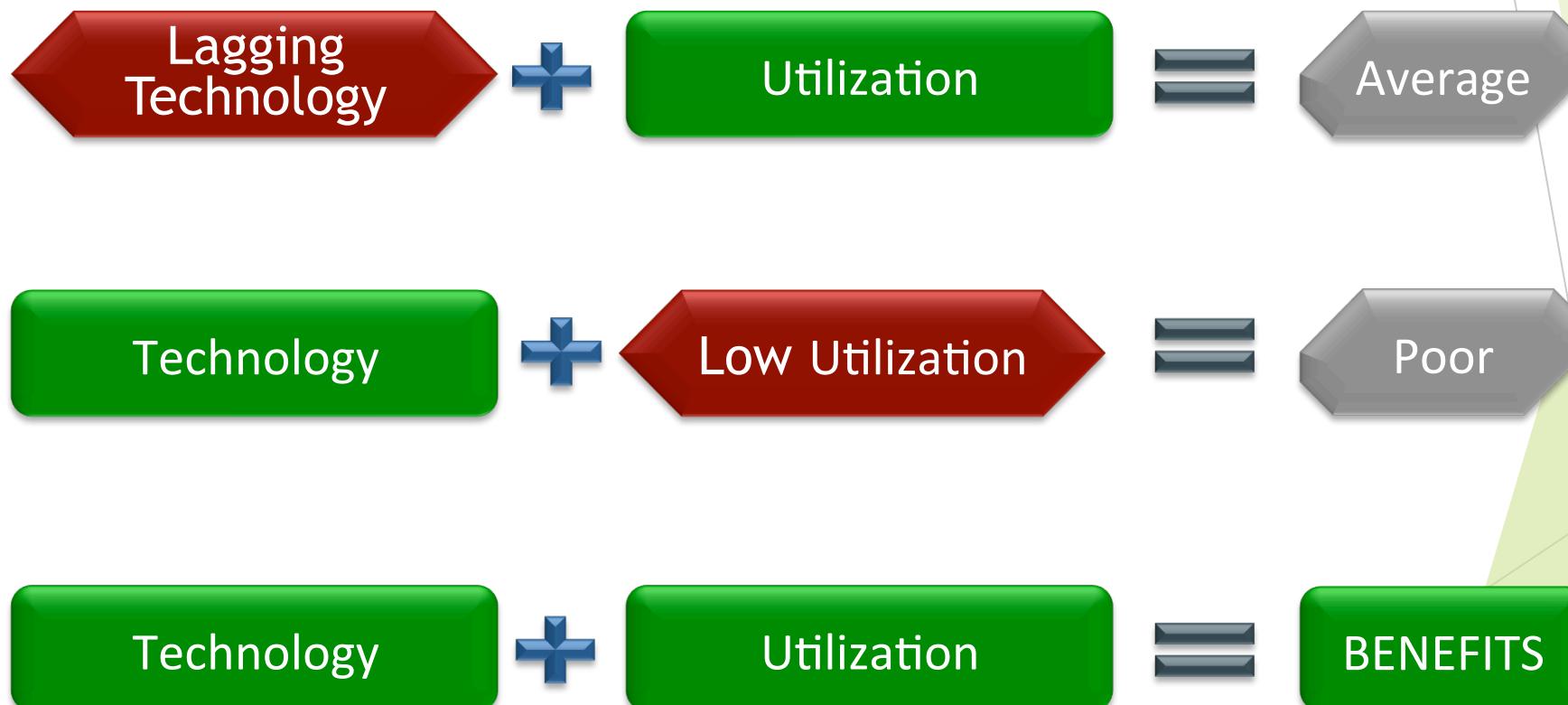
— 18-29 — 30-49 — 50-64 — 65+

Note: The Center has used several different question wordings to identify broadband users in recent years, which may account for some variance in broadband adoption figures between 2015 and 2018. Our survey conducted in July 2015 used a directly comparable question wording to the one conducted in January 2018.

Source: Surveys conducted 2000-2018.

Take a Comprehensive Look at Broadband

**In the Broadband equation,
the quality of each input affects the outcome**



Funding: Where we are right now

- ConnectME Fund (.25% on landlines and broadband - about \$900K)
- \$1.9M from an assessment on phone lines (starting 1/2020)
- \$30M in Gov. proposed bond package. Infrastructure only, but can be used for engineering related to infrastructure build.
- Foundations (Libra) Other potential investors.

Federal Funding Soft Bigotry of Low Expectations.

USDA

Reconnect \$600M/\$550M

Distance Learning and Telemedicine

Community Connect

RUS loans

FCC - CAFII, ACAM, Next auction

84 bills introduced in Congress.

Other Legislation/ Regulatory processes:

Poles, Poles, Poles.

TIFs

Broadband as a utility

Telehealth

Net Neutrality

Privacy

Small Cells

Digital Inclusion - taking advantage of the promise of the internet

National Digital Equity Center - Maine based national leader

- ▶ Americorps program to expand digital literacy courses statewide
- ▶ Digital Equity - how do we make sure everyone gets it?
- ▶ Telehealth/Telemedicine
- ▶ Homework Gap

How do we lower the costs of a build?

It's all about levers.

- Increase demand and take rates
 - Increased usage make builds more financially feasible.
- Lower costs
 - (poles, interest rates, CME grants, federal funds)
- Explore new business models to support expansion
- Expand telehealth options and uses
 - \$54M in Medicaid Transportation
- Get real data on economic impact.
 - Broadband is a cheap economic tool. Very cheap.

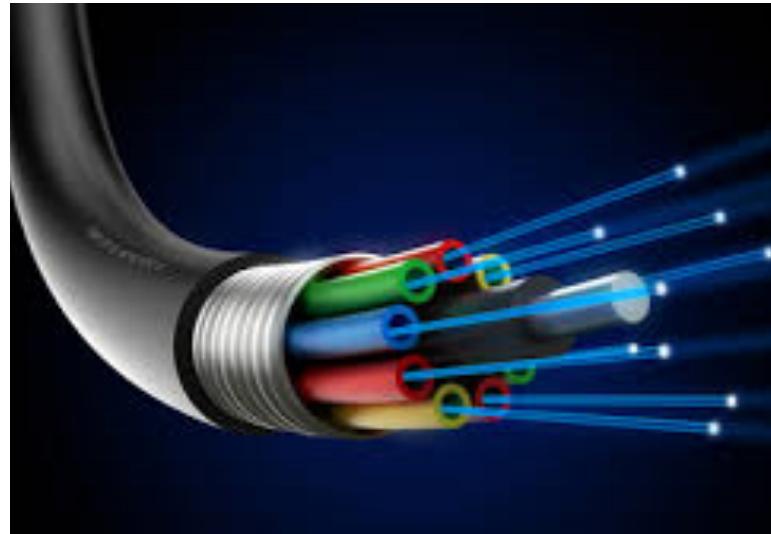
Municipal Broadband in Maine: One size does not fit all

- ▶ Maine has many models for municipal ownership:
 - ▶ SanfordNet - connecting to the 3RB for its business sector
 - ▶ Islesboro - FTTP, underwritten by property tax
 - ▶ Rockport, Fiber to downtown
 - ▶ South Portland - Serve as the anchor tenant for Fiber expansion
 - ▶ The Cranberrys - FTTP, USDA Community Connect Grant
 - ▶ Baileyville-Calais (Downeast Broadband) Utility District
 - ▶ Cheabegue - brought DSL to island, sold to Axiom
 - ▶ Nationally over 800 Communities have some form of public ownership of the asset

What we know



Broadband is a necessity



The technology is easy



Broadband drives economic growth and is key to attracting population and workforce

What can you do?

- ▶ DO A SPEED TEST. ConnectME website has a link
 - ▶ speedtest.net
- ▶ Become a broadband champion in your community
- ▶ Create or work with your local Broadband Committee
- ▶ Contact your legislator to support the Bond
- ▶ Don't stop when you get connected